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Control System Modernization for the Advanced Test Reactor Critical (ATRC) Facility

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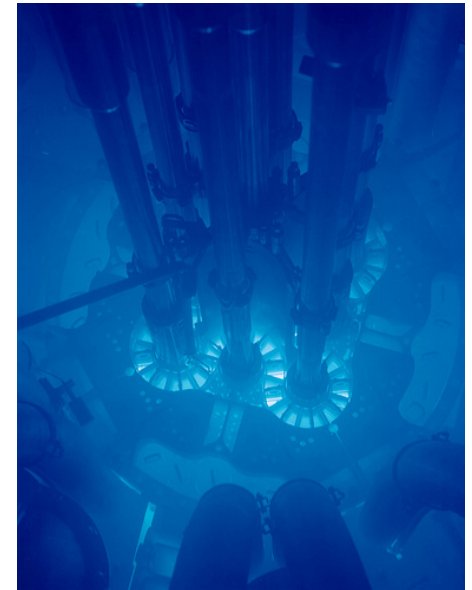


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Advanced Test Reactor Critical (ATRC) Facility Overview

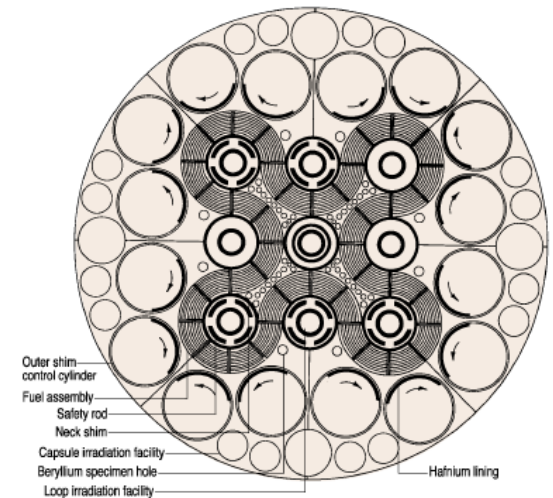
- The Advanced Test Reactor Critical (ATRC) Facility is a low-power research reactor located in the Advanced Test Reactor (ATR) complex at Idaho National Laboratory (INL)
- ATRC is a small pool type reactor, cooled by water under natural convection, located in the ATR canal
- The typical operating power level of the ATRC core is 600W or less.
- Operation of the ATRC reactor is controlled from the reactor console located at ground level in the facility.





Advanced Test Reactor Critical (ATRC) Facility Overview

- The ATRC core is a replica of the ATR design.
- The primary purpose of ATRC is to obtain data on nuclear characteristics of the ATR core including rod worths and calibrations, excess reactivities, neutron flux distributions, fuel loading requirements, and effects of insertion and removal of experiments. Nearly all new ATR experiments must undergo ATRC testing before insertion into the ATR.
- Recently, ATRC has also been used for standalone NSUF experiments.

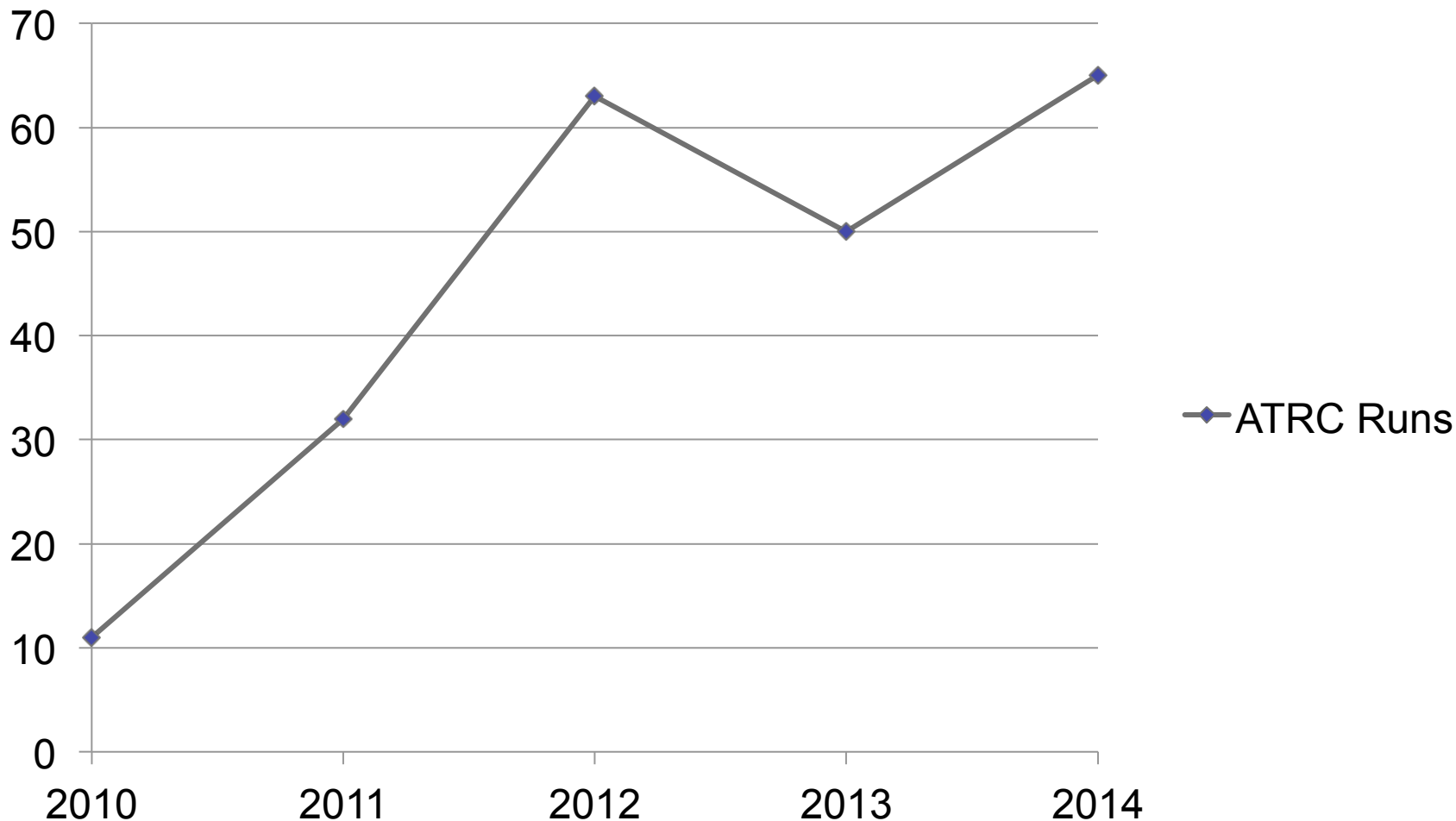




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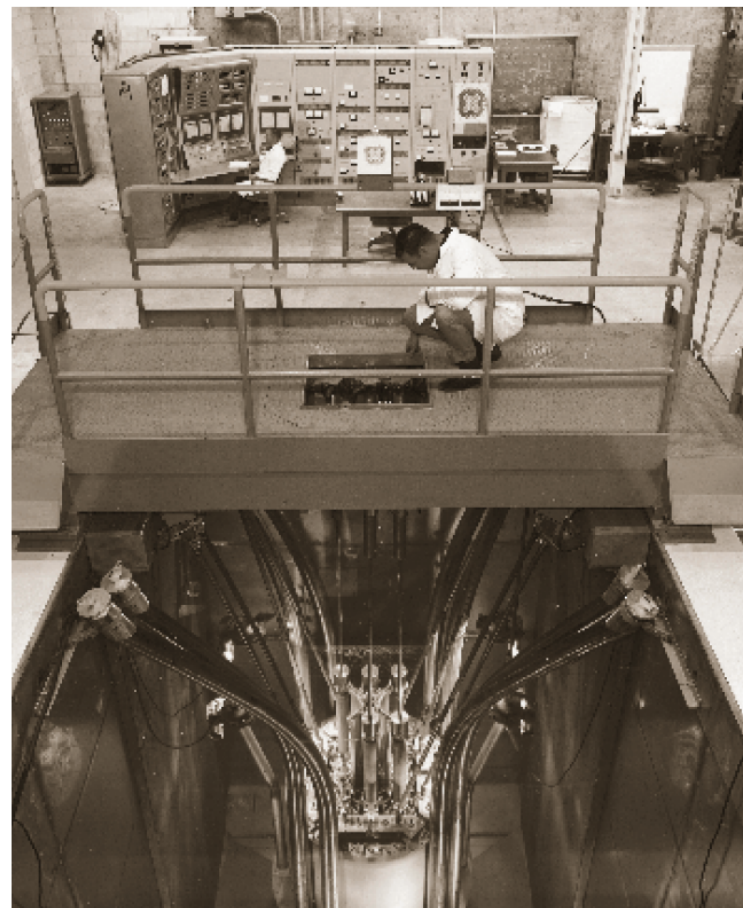
The demand on ATRC has dramatically increased since FY2010





ATRC Control System Modernization

- The purpose of this solicitation (NEET-5) is for the detailed design of a modern control system for ATRC.
- A modern control system will help to ensure the continued availability and reliability of ATR for experimental use
- ATRC was designed and constructed in the early 1960s. Most of the existing control system is 1960's or early 1970's vintage and is well beyond its expected life cycle.





ATRC Control System Modernization

- The work scope includes the design changes necessary to make the reactor shutdown system compliant with current standards and requirements, but limits the application of digital processor technology to non-safety functions.
- All safety class functions would continue be performed with analog I&C components.
- Applicants must be able to meet applicable access and quality assurance requirements.



ATRC Control System Modernization

The design effort would include the following systems:

■ **Reactor Shutdown System (RSS)**

- Neutron Level Subsystem
- Log-N/Period Subsystem
- Manual Scram Subsystem
- Scram Logic Subsystem

■ **Log Count Rate Meter (LCRM) System**

■ **Non-RSS Scram System**

- Seismic Switch Subsystem



ATRC Control System Modernization

■ Rod Control System

- Safety Rod Controls Subsystem
- Outer Shim Controls Subsystem
- Neck Shim Controls Subsystem
- Neutron Start-up Source Control Subsystem
- Control Element Drive Interlock Function Subsystem

■ Digital Reactivity Measurement System

■ Annunciator System and Indicator Lights System



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